Poultry Waste Generation and Land Application in the Illinois River Watershed and Phosphorus Loads to the Illinois River Watershed Streams and Rivers and Lake Tenkiller

Expert Report of Dr. B. Engel

For
State of Oklahoma
In Case No. 05-CU-329-GKF-SAJ

State of Oklahoma v. Tyson Foods, et al.
(In the United States District Court for the Northern District of Oklahoma)

Dr. B. Engel, P.E.
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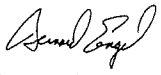
May 14, 2008



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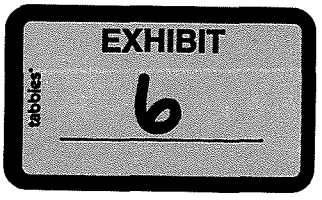

Table 3.2. Poultry Waste and P Production within the IRW Based on Defendant Supplied Poultry Production Data

Year	Total Waste (tons)	Total P (lbs)
2001	420,555	8,732,752
2002	425,308	8,801,173
2003	440,920	9,176,463
2004	482,407	9,975,305
2005	476,649	9,819,383
2006	445,364	9,000,113

The annual poultry waste produced by integrator based on defendant supplied poultry production data is shown in Table 3.3. Each defendant produces a substantial amount of waste with Tyson producing approximately ½ of the waste.

Table 3.3. Poultry Waste by Defendant within the IRW Based on Defendant Supplied Poultry Production Data for 2001-2006

	Poultry Waste (tons)					
Year	Cal-Maine	Cargill	Georges	Peterson	Simmons	Tyson+Cobb
2001	18,626	45,086	69,510	27,970	40,247	219,116
2002	14,561	44,698	67,494	30,450	45,996	222,110
2003	10,821	49,843	73,401	31,382	48,610	226,862
2004	6,712	52,257	73,730	44,199	66,381	239,128
2005	3,135	49,845	76,879	38,269	82,585	225,936
2006	0	33,984	80,943	35,574	71,608	223,256

The annual P produced in poultry waste by integrator based on defendant supplied poultry production data is shown in Table 3.4. Each of the defendants' poultry operations produce a substantial amount of P in poultry waste with Tyson's producing approximately ½ of P in poultry waste.

Table 3.4. Phosphorus in Poultry Waste by Defendant within the IRW Based on Defendant Supplied Poultry Production Data for 2001-2006

	P in Poultry Waste (lbs)					
Year	Cal-Maine	Cargill	Georges	Peterson	Simmons	Tyson+Cobb
2001	396,398	1,484,311	1,452,470	543,414	768,007	4,088,152
2002	311,363	1,471,544	1,404,951	591,594	877,722	4,143,999
2003	233,511	1,640,927	1,532,054	609,705	927,592	4,232,673
2004	145,707	1,720,395	1,522,252	858,725	1,266,712	4,461,513
2005	71,837	1,640,986	1,571,747	743,505	1,575,910	4,215,398
2006	0	1,118,799	1,658,320	691,157	1,366,453	4,165,384